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The Prediction of Early Army Attrition Through the Use of Autobiographical Information Questionnaires

by

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PREFACE

This report describes research conducted as part of the United States Army's Quality Selection Project and directed at determining the feasibility of autobiographical information questionnaire usage in the early identification of Army enlistees who meet current enlistment standards, but who will not successfully complete their first 180 days of military service.

The research was conducted by Richardson, Bellows, Henry & Company, Inc. (RBH) under contract DAHC 19-76-C-0036 with the U.S. Army Research Institute for the Behavioral and Social Sciences. The project was conducted under the direction of Mr. Frank W. Erwin and Dr. Blake A. Frank of RBH, with Mr. Leonard Seeley of ARI serving as contracting officer's technical representative (COTR).

Special appreciation is expressed to personnel at Forts Sill and Dix who coordinated the administration of the experimental instruments.

ABSTRACT

Problem-Objectives

This report describes a follow-up research project into the feasibility of using autobiographical questionnaires in the early identification of individuals who are not likely to complete their first 180 days of service due to a failure to adapt to the Army experience.

Procedures

Two autobiographical questionnaires were administered during November, 1976 to February, 1977 to approximately 4,500 incoming male enlistees at the Forts Dix and Sill Reception Stations. After 180 days, status data on all participating enlistees were secured from Pentagon records. The final analysis sample of 4,282 included enlistees who completed 180 days of service (N=3,660) and enlistees who had been separated prior to that time for failure to adapt reasons (N=622). This sample and the sample available from a previous study were used to validate and cross-validate empirically developed questionnaire keys. The analysis was conducted in the following four stages: (1) The keys developed in the original study (Phase I) were applied to the questionnaires in the current study (Phase II); (2) The Phase I questionnaires were re-keyed and the keys applied to the Phase I and Phase II data; (3) The Phase II questionnaires were keyed and the keys applied to the Phase I and Phase II data; and (4) The questionnaire items unique to Phase II were keyed and cross-validated in specially constructed matched half samples.

Results

The results of the original study, which suggested that autobiographical information could assist in early attrition identification, were strongly confirmed by the results of the follow-up study. A substantial number of items have been validated and cross-validated and are now available for use considerations. Black and white enlistee subgroups show no appreciable difference in average scores.

Recommendations

1. The effectiveness of this instrument type in identifying potential enlistees not likely to complete 180 days of service should be subjected to an operational AFEES trial.

2. Consideration also should be given to research into autobiographical questionnaire utility in predicting long-term attrition.

THE PREDICTION OF EARLY ARMY ATTRITION THROUGH THE USE OF AUTOBIOGRAPHICAL INFORMATION QUESTIONNAIRES

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INTRODUCTION

Since the termination of the draft system in 1973, the Army has had to rely solely on enlistees to provide the manpower necessary to fullfill its mission. During this same period, there has been an increasing focus on personnel attrition. Under the Army's present Training and Doctrine Command (TRADOC) 635-1 regulations, approximately eight to ten percent of all incoming enlistees are discharged during Basic Combat Training (BCT) due to their inability to adapt to Army life. An additional eight to ten percent of those completing BCT are separated for the same reason prior to completing their first six months of military service. Given the size of the total incoming enlistee population, the direct costs to the Army of such attrition rates are substantial.

The research project described herein was initiated in this context as part of the Army's effort to explore the possibility of reducing its personnel attrition rates through the use of new selection procedures.

Phase I

The first phase of this research into the feasibility of using autobiographical information as a tool for reducing early Army Attrition was completed in 1977 (Erwin and Herring, 1977). Approximately 3,000 enlistees at Forts Dix and Jackson completed one or both of two autobiographical questionnaires. Keys were developed for both instruments on the total available sample and various sample subsets, and the resulting scores were correlated with a criterion of discharged vs. not discharged for failure to adapt reasons before the conclusion of 180 days of service.

Briefly summarized, the Phase I research findings included the following.

- As measured by item responses and scores on the two questionnaires, enlistees discharged before the end of Basic Combat Training (BCT) were essentially similar to enlistees who completed BCT, but were discharged before the end of 180 days.

- Enlistees who were discharged prior to completing 180 days of service responded to approximately two-thirds of the questionnaire items in a pattern significantly different from enlistees who had not been discharged during that period.

- Enlistee scores produced by the questionnaire keying procedures were found to be significantly related to the 180 day discharged vs. not discharged criterion.

- White and Black enlistees showed very similar results in questionnaire response patterns and no significant differences were observed in either questionnaire score means or score-criterion relationships.

Phase II

The primary purpose of the present research was to implement the recommendations suggested at the conclusion of Phase I. Specifically, the objectives of this study were to utilize additional enlistee samples (1) to determine the cross-validity of the key and item scores developed in Phase I, (2) to determine the validity and cross-validity of a new set of items developed as a result of the Phase I findings, and (3) to revise, if necessary, the keys developed in Phase I in order to enhance their cross-validity.

Report Objectives

The purpose of this report is to describe the results of the Phase II investigation into the feasibility of using empirically keyed autobiographical questionnaires to identify potential enlistees with a high probability of failing to complete their first six months of military service due to a failure to adapt to Army life. The report contains descriptions of (1) the measurement instruments used, (2) the samples of participating enlistees, (3) the enlistee performance data developed (4) the analyses of questionnaire and performance data, and (5) the results obtained. Recommendations for further investigation of this measurement approach also are included.

PROCEDURES

Questionnaires

In Phase I, two questionnaires, the Enlistee Profile (EP) and the Early Experience Questionnaire (EEQ), were administered and analyzed. Sixty-one (61) items in these questionnaires were identified in the Phase I item analysis as being significantly related to the 180 day discharge criterion. For purposes of this study, these items were included in an Early Experience Questionnaire-3A (EEQ-3A), which could be categorized into the following general content areas.

- Academic experiences-perceptions
- Self concept
- Social style-participation
- Work history-values
- Army experience expectations

A factor analysis of the intercorrelations among the 61 Phase I items also was computed. The results of this analysis, as well as a more subjective item content analysis, suggested that certain content areas could be expanded through the development of additional items. Thus, a set of 51 additional items were incorporated into an Early Experience Questionnaire-3B (EEQ-3B), which covered the following general content areas.

- Athletic - physical competence
- Army experience expectations

- Self concept
- Work history-preferences
- Family experiences

Enlistee Performance And Related Data

The principal criterion for this study was still in service at the end of 180 days versus discharged prior to that time for a failure to adapt reason. All separations oocurring between enlistee entry and data collection dates were secured from Pentagon files and recorded by type. Separation types then were classified by ARI personnel to identify enlistees separated for failure to adapt as opposed to separation for other reasons; i.e., medical, hardship, etc. Since there also was an interest in studying the moderating effects of several other variables, data on AFQT scores, education level, and ethnic group membership also were collected.

Data Collection

The EEQ-3A and EEQ-3B questionnaires were administered during the period November 1976 to February 1977 to incoming male enlistees at the Fort Dix and Fort Sill Reception Stations, which had been identified as research sites by Army personnel. After on-site briefing and training by RBH staff, Army personnel conducted all questionnaire administrations and returned completed questionnaires directly to RBH offices for processing.

In September, 1977, a computer tape containing the name, Social Security Number, AFQT score, post, and date of entry of each enlistee who had completed the questionnaires was prepared and transmitted for use by Army personnel to access Military Personnel Center master personnel tapes and obtain each enlistee's current pay grade, current status, including discharge code and date, if any, and education level. Only 156 cases were unavailable for the 180 day analyses due to an inability to match incorrect Social Security Numbers provided by the enlistees involved with their correct numbers in Army Records.

S.

The principal analysis sample consisted of all Fort Sill - Fort Dix enlistees who had completed the EEQ-3A and EEQ-3B questionnaires, had completed 180 days of service, or had been discharged for a failure to adapt reason before completing such service. Criterion data were available on 4,373 of the 4,529 enlistees who had completed the questionnaires. The final total analysis sample of 4,282 included all those who were still in service at the time of data collection (N=3,660), plus those who had been discharged by that time for a failure to adapt reason (N=622). Although approximately 25 of this latter group had been discharged shortly after the 180 day period, they were included in the discharge sample.

Table 1 which follows presents the criterion distribution for the total analysis sample and each post. It shows a total sample discharge rate of 14.5%. The data also show significant differences in the attrition rates reported for the two post subsamples ($z=3.15$, $p<.001$). Enlistees entering the Army at Fort Sill experienced a higher discharge rate (16.2%) during the period studied than enlistees entering the Army at Fort Dix (12.8%).

Tables 2, 3, and 4 display descriptive data on AFQT scores, education, and attrition rate by ethnic group for the total sample and each post. As the data indicate, significant differences exist between the attrition rates of the white and black ($z=4.83$, $p<.001$) and the white and other ethnic subgroups ($z=3.14$, $p<.001$) in the total sample.

Table 1

Total Analysis Sample by Post and Criterion

	Total Sample[a]		Fort Dix		Fort Sill	
	N	%	N	%	N	%
Total	4,282	100.0	2,075	100.0	2,204	100.0
Still in Service	3,660	85.5	1,810	87.2	1,847	83.8
Separated Due to Failure to Adapt	622	14.5	265	12.8	357	16.2

[a] Due to missing post codes, the total sample contains three more cases than the sum of the posts combined.

Table 2

Demographic Characteristics: Total Sample

Ethnic Group	N[a]	AFQT Scores M	AFQT Scores SD	Education Level[b] M	Education Level[b] SD	Separation Rate %
White	2,816	55.83	18.80	3.08	1.04	16.6
Black	1,105	41.00	13.92	2.75	1.08	10.5
Other Ethnic	340	45.62	15.53	2.96	1.08	10.0
Total Sample	4,282	51.14	18.61	2.99	1.04	14.5

[a] Due to missing variable codes, the sum of the subsamples will differ from the total sample N.

[b] Education codes utilized were (1) More than High School, (2) High School Diploma, (3) GED, and (4) Non-High School, Non-GED. The lower the mean, therefore, the higher the sample's education level.

Table 3

Demographic Characteristics: Fort Sill Subsample

Ethnic Group	N[a]	AFQT Scores M	AFQT Scores SD	Education Level[b] M	Education Level[b] SD	Separation Rate %
White	1,497	54.56	18.10	3.22	1.00	18.4
Black	551	41.19	13.95	2.66	.99	11.4
Other Ethnic	148	44.32	14.89	2.97	1.08	10.8
Total	2,204	50.48	17.95	3.06	1.03	16.2

[a], [b] See Table 2 above.

Table 4

Demographic Characteristics: Fort Dix Subsample

Ethnic Group	N[a]	AFQT Scores M	AFQT Scores SD	Education Level[b] M	Education Level[b] SD	Separation Rate %
White	1,317	57.35	19.35	2.92	1.05	14.5
Black	553	40.89	13.80	2.84	1.02	9.6
Other Ethnic	192	46.62	15.97	2.96	1.09	9.4
Total	2,075	51.91	19.18	2.90	1.05	12.8

[a], [b] See Table 2 above.

DATA ANALYSIS

Item Analysis

The underlying logic in autobiographical questionnaire research and use is that many of the questions such instruments contain will be answered in a significantly different fashion by various subgroups in the samples studied. In this instance, the research called for a systematic comparison of questionnaire responses of two subgroups of Army enlistees--those who completed their first 180 days of service versus those who could not adapt and were discharged before the end of that period.

The computer program used in these analyses computes the frequency and percentage of responses by criterion category and the mean criterion value for each alternative in each questionnaire item. Additionally, the program computes phi coefficients between each item alternative (categorized as responses to the alternative versus all other responses) and the criterion variable (categorized as discharged versus not discharged). Finally, for items whose alternatives constitute a continuum, the Pearson product-moment correlation is computed between the item and the criterion.

Item Weighting-Keying

As indicated, the item analysis procedure serves to identify those questionnaire items on which the response patterns of those remaining in the Army are significantly different from those who fail to adapt. To create a "score" reflecting these differences when they were observed, a simple unit weighting scheme was adopted to assign weights to item response patterns found significantly related to the discharged-not discharged criterion. In general, weights of 0 or 2, depending on the direction of the relationship, were assigned to an item alternative if its correlation with the criterion was significant at the .05 level or less and at least 10% of the sample had selected it. Where appropriate, a weight of 1 was assigned to the non-significant alternatives within each keyed item. Departures from this scheme were made infrequently and only after extremely careful evaluation by more than one professional. In addition, such departures involved only the 10% response requirement; the .05 significance of relationship rule never was violated.

Stage 1

Stage 1 of this study's analysis was undertaken to evaluate the cross-validity of the total sample keys developed in Phase I on the Enlistee Profile (EP) and Early Experience Questionnaire (EEQ) by scoring all Phase II subjects' EEQ-3A questionnaires with the Phase I keys and correlating these scores with the available criterion and demographic variables. In addition, since only one-third of all Phase I subjects had completed both questionnaires, the

validity of the EP and EEQ items combined had not been evaluated. Thus, a secondary objective of this stage was to evaluate the cross-validity of the combination of the two questionnaires' keyed items. The final objective of this stage was to estimate the validity of the EP and EEQ key scores combined for the 1,137 subjects who had completed both questionnaires in Phase I.

Stage 2

Stage 2 involved the re-keying of the Phase I items to take into account a phenomenon observed in the keying of Phase II EEQ-3A items (Stage 3). In keying the items whose alternatives formed a continuum and whose content called for a self-appraisal, it was noted that the most socially desirable response (e.g. I was the best, etc.), which can have a significant impact on an item's criterion validity, typically tended to have a non-significant, rather than a significant criterion relationship. For example, keying the most socially desirable alternative with a weight appropriate to its position on the continuum might yield an item-criterion correlation coefficient of .072 (highly significant for the sample at hand). However, when the socially desireable alternative was neutralized, in effect breaking the continuum, the item validity often improved substantially, perhaps increasing from the previously presented .072 to .095. A re-examination of the original Phase I item analyses indicated that the same phenomenom was present in that data, but had not been controlled for in the original item weighting. This led to development of a new unit weight key for the Phase I EP and EEQ items. Phase I and Phase II subjects were scored with this key, and the scores were correlated with the available criterion and demographic data.

Stage 3

In this stage, a simple unit weight key was developed for the EEQ-3A items. Data in both Phase I and Phase II were scored with the key, and the scores were correlated with the available criterion and demographic data.

Stage 4

As mentioned, the EEQ-3B questionnaire contained items original to this second study. Stage 4's objective, therefore, was to develop and cross-validate EEQ-3B item keys based on essentially equivalent half samples of the Phase II total sample. For this purpose, the total Phase II analysis sample was ordered according to post, month and year of Army entry, criterion category, educational level, ethnic group, and AFQT score. Half 1 (N=2,141) was comprised of the odd-numbered individuals on the ordered list; Half 2 (N=2,141) consisted of the even-numbered individuals on the list. Tests of variable means and proportions of the matching variables revealed no significant differences between the two samples.

Simple unit weight keys then were developed on each half Sample and cross-validated in the other half. In addition, a key consisting of the items valid in the total Phase II sample was constructed. The half and total sample keys were applied to each half and the total sample, and scores were correlated with the available criterion and demographic data.

RESULTS

Stage 1

Table 5 presents a comparison of the application of the original Phase I unit weight keys to the Phase I and Phase II questionnaire data.

For both questionnaires, some shrinkage in validity was observed on cross-validation, with the greater decrease in validity observed for the Enlistee Profile scores. A combination of the scores achieved on the two questionnaires yielded a criterion cross-validity at essentially the same level as the Enlistee Profile key alone.

An examination of the Phase I - Phase II subgroup validities generally shows shrinkage for whites similar to that observed for the total sample. Greater shrinkage was observed for the black subgroup.

A review of the Phase I - Phase II post validities shows no change in validity for the Fort Dix subgroups. Similar comparative data were not available for either the Fort Jackson or Fort Sill samples. Validities for Fort Sill were somewhat lower than those observed for Fort Dix.

Table 5

Phase I Unit Weight Keys:Score-Criterion Relationships By Study Phase

Key[b]	Phase I N	M	SD	r_b	Phase II[a] N	M	SD	r_b
			Total Samples					
EP-Enlistee Profile	2,112	35.25	6.69	.42	4,282	33.52	6.82	.31
EEQ-Early Experience Questionnaire	2,182	18.57	4.17	.34	4,282	17.57	4.25	.28
EP+EEQ[c]	-	-	-	-	4,282	47.26	9.36	.32
			All Whites					
EP-Enlistee Profile	1,319	35.10	7.11	.44	2,816	32.87	7.14	.32
EEQ-Early Experience Questionnaire	1,478	18.37	4.39	.36	2,816	17.14	4.49	.27
EP+EEQ[c]	-	-	-	-	2,816	46.30	9.87	.32
			All Blacks					
EP-Enlistee Profile	569	35.71	5.80	.47	1,105	35.16	5.72	.23
EEQ-Early Experience Questionnaire	548	18.88	3.58	.27	1,105	18.55	3.40	.21
EP+EEQ[c]	-	-	-	-	1,105	49.59	7.60	.23

[a] All Phase II data are follow-up, or cross-validation, data.

[b] The items in the Phase I keys listed were contained in the EEQ-3A questionnaire in Phase II.

[c] These data were not computed on this key in Phase I.

Table 5 (Cont'd)

Phase I Unit Weight Keys:Score-Criterion Relationships By Study Phase

Key[b]	Phase I N	M	SD	r_b	Phase II[a] N	M	SD	r_b
			Fort Dix					
EP-Enlistee Profile	1,018	34.48	6.89	.35	2,075	33.98	6.92	.36
EEQ-Early Experience Questionnaire	1,134	18.43	4.24	.29	2,075	18.08	4.24	.31
EP+EEQ[c]	-	-	-	-	2,075	48.10	9.50	.36
			Fort Jackson[d]					
EP-Enlistee Profile	1,094	35.97	6.25	.50	-	-	-	-
EEQ-Early Experience Questionnaire	1,048	18.71	4.09	.35	-	-	-	-
EP+EEQ[c]	-	-	-	-	-	-	-	-
			Fort Sill[d]					
EP Enlistee Profile	-	-	-	-	2,204	33.09	6.71	.27
EEQ-Early Experience Questionnaire	-	-	-	-	2,204	17.09	4.21	.25
EP+EEQ[c]	-	-	-	-	2,204	46.48	9.16	.28

[a] All Phase II data are follow-up, or cross-validation, data.

[b] The items in the Phase I keys listed were contained in the EEQ-3A questionnaire in Phase II.

[c] These data were not computed on this key in Phase I.

[d] Fort Jackson was represented in Phase I only; Fort Sill was represented in Phase II only.

Stage 2

The results for the revised Phase I unit weight keys applied to the Phase I and Phase II questionnaire data are presented in Table 6.

The initial validities resulting from the revised keys are slightly higher than those observed for the original keys, and the cross-validities show a similar pattern. The magnitude of the increase in validity, however, is slight, generally about two points in the second decimal place.

As with the original keys, no improvement in validity was observed for the combination of the scores achieved on the two questionnaire keys. A pattern of validity and cross-validity similar to that of the original keys was observed for all sample subgroups. On both the original and the revised Phase I keys, black enlistee scores were slightly higher and somewhat more restricted than those achieved by whites.

Table 6

Revised Phase I Unit Weight Keys:Score-Criterion Relationships By Study Phase

Key[b]	Phase I N	M	SD	r_b	Phase II[a] N	M	SD	r_b
			Total Samples					
EP-Enlistee Profile	2,112	52.44	9.94	.42	4,282	50.14	9.71	.33
EEQ-Early Experience Questionnaire	2,182	29.06	6.38	.32	4,282	27.13	6.37	.29
EP+EEQ	1,137	74.53	13.88	.36	4,282	71.94	13.50	.34
			All Whites					
EP-Enlistee Profile	1,319	52.43	10.50	.42	2,816	49.41	10.17	.34
EEQ-Early Experience Questionnaire	1,478	28.79	6.73	.35	2,816	26.57	6.76	.29
EP+EEQ	757	74.28	14.92	.35	2,816	70.72	14.29	.34
			All Blacks					
EP-Enlistee Profile	569	52.69	8.81	.51	1,105	52.00	8.30	.26
EEQ-Early Experience Questionnaire	548	29.40	5.41	.26	1,105	28.38	5.09	.21
EP+EEQ	276	74.21	11.04	.46	1,105	74.81	10.98	.25

[a] All Phase II data are follow-up, or cross-validation, data.

[b] The items in the Phase I keys listed were contained in the EEQ-3A questionnaire in Phase II.

Table 6 (Cont'd)

Revised Phase I Unit Weight Keys: Score-Criterion Relationships By Study Phase

Key[b]	Phase I N	M	SD	r_b	Phase II[a] N	M	SD	r_b
			Fort Dix					
EP-Enlistee Profile	1,018	51.41	10.19	.35	2,075	50.74	9.85	.38
EEQ-Early Experience Questionnaire	1,134	28.85	6.51	.29	2,075	27.92	6.39	.33
EP+EEQ	1,014	74.35	13.81	-	2,075	73.11	13.71	.38
			Ford Jackson[c]					
EP-Enlistee Profile	1,094	53.39	9.61	.51	-	-	-	-
EEQ-Early Experience Questionnaire	1,048	29.27	6.22	.34	-	-	-	-
EP+EEQ	123	76.01	14.40	.35	-	-	-	-
			Fort Sill[c]					
EP Enlistee Profile	-	-	-	-	2,204	49.57	9.54	.29
EEQ-Early Experience Questionnaire	-	-	-	-	2,204	26.39	6.27	.25
EP+EEQ	-	-	-	-	2,204	70.84	13.21	.30

[a] All Phase II data are follow-up, or cross-validation, data.

[b] The items in the Phase I keys listed were contained in the EEQ-3A questionnaire in Phase II.

[c] Fort Jackson was represented in Phase I only; Fort Sill was represented in Phase II only.

Stage 3

Table 7 presents the results of the application of the EEQ-3A unit weight keys developed in Phase II to the comparable Phase I and II items.

The initial validity of the Phase II EP item key was slightly lower than the initial validity of the Phase I EP item key, but the Phase II validity did not shrink on cross-validation. The initial and cross-validities of the EEQ item key were the same in both phases. Some slight shrinkage was observed on cross-validation.

The combination of the EP and EEQ item keys in Phase II yielded an initial validity no higher than the EP item key alone. While more shrinkage was observed on cross-validation for the combined Phase II key than the combined Phase I key, it should be noted that all validities computed on the Phase I combination involved only 1,137 cases and thus are not strict estimates of combination validities or cross validities in Phase I.

Table 7

Phase II EEQ-3A Unit Weight Key:Score-Criterion Relationships By Study Phase

Key[b]	Phase I[a] N	M	SD	r_b	Phase II N	M	SD	r_b
			Total Samples					
EEQ-3A (EP Items)	2,112	49.80	9.49	.38	4,282	47.77	9.62	.37
EEQ-3A (EEQ Items)	2,182	26.41	5.84	.29	4,282	24.85	6.15	.32
EEQ-3A (EP+EEQ)	1,137	69.35	13.16	.31	4,282	67.14	13.23	.38
			All Whites					
EEQ-3A (EP Items)	1,319	49.30	10.07	.37	2,816	49.41	10.17	.37
EEQ-3A (EEQ Items)	1,478	26.09	6.10	.33	2,816	26.57	6.76	.32
EEQ-3A (EP+EEQ)	757	68.59	14.04	.31	2,816	65.56	13.95	.37
			All Blacks					
EEQ-3A (EP Items)	569	50.82	8.27	.47	1,105	50.21	8.01	.32
EEQ-3A (EEQ Items)	548	26.89	4.99	.20	1,105	26.20	5.01	.25
EEQ-3A (EP+EEQ)	276	70.11	10.60	.38	1,105	70.67	10.64	.31

[a] All Phase I data are follow-up, or cross-validation, data.

[b] The items in Phase I keys were contained in the EEQ-3A questionnaire in Phase II.

Table 7 (Cont'd)

Phase II EEQ-3A Unit Weight Key: Score-Criterion Relationships By Study Phase

Key[b]	Phase I[a] N	M	SD	r_b	Phase II N	M	SD	r_b
Fort Dix								
EEQ-3A (EP Items)	1,018	48.88	9.85	.30	2,075	48.49	9.67	.41
EEQ-3A (EEQ Items)	1,134	26.22	5.94	.24	2,075	25.71	6.15	.37
EEQ-3A (EP+EEQ)	1,014	69.25	13.15	.30	2,075	68.48	13.33	.39
Fort Jackson[c]								
EEQ-3A (EP Items)	1,094	50.65	9.07	.46	-	-	-	-
EEQ-3A (EEQ Items)	1,048	26.62	5.71	.34	-	-	-	-
EEQ-3A (EP+EEQ)	123	70.25	13.25	.35	-	-	-	-
Fort Sill[c]								
EEQ-3A (EP Items)	-	-	-	-	2,204	47.08	9.53	.34
EEQ-3A (EEQ Items)	-	-	-	-	2,204	24.05	6.05	.27
EEQ-3A (EP+EEQ)	-	-	-	-	2,204	65.86	13.02	.34

[a] All Phase I data are follow-up, or cross-validation, data.

[b] The items in Phase I keys were contained in the EEQ-3A questionnaire in Phase II.

[c] Fort Jackson was represented in Phase I only; Fort Sill was represented in Phase II only.

Stage 4

Table 8 presents the validation and cross-validation results for the EEQ-3B, the questionnaire which contained items original to the Phase II study.

As the data indicate, both half sample keys yielded essentially the same initial validity, r=.36. Both keys suffered some shrinkage on cross-validation, with the Half Sample 2 key validity shrinking more than that of the Half Sample 1 key.

The Total Sample key validity was slightly lower than both of the initial half sample validities and slightly higher than both of the half sample cross-validities. The black-white score patterns described earlier are also present in the EEQ-3B scores.

Table 8

Phase II EEQ-3B Keys:Score-Criterion Relationships

Samples	N	Half 1 Key M	Half 1 Key SD	r_b	Half 2 Key M	Half 2 Key SD	r_b	Total Sample Key M	Total Sample Key SD	r_b
				Total Samples						
Half 1	2,141	35.76	5.78	.36[a]	41.28	6.51	.24	39.72	6.63	.32
Half 2	2,141	35.81	5.91	.30[b]	41.20	6.81	.36	39.84	6.85	.33
Total	4,282	35.78	5.84	.33[c]	41.24	6.66	.30	39.78	6.74	.33
				All Whites						
Half 1	1,403	35.54	5.96	.36	40.73	6.66	.23	39.23	6.81	.32
Half 2	1,413	35.48	6.19	.31	40.51	7.14	.37	39.15	7.19	.33
Total	2,816	35.51	6.08	.34	40.62	6.90	.30	39.19	7.00	.32
				All Blacks						
Half 1	558	36.24	5.22	.29	42.64	5.76	.17	40.88	5.96	.26
Half 2	547	36.40	5.13	.20	42.80	5.62	.28	41.35	5.72	.25
Total	1,105	36.32	5.18	.25	42.72	5.69	.22	41.11	5.84	.26
				Fort Dix						
Half 1	1,045	36.07	5.80	.32	41.46	6.55	.21	40.01	6.80	.29
Half 2	1,030	36.07	5.92	.36	41.43	6.76	.47	40.12	6.90	.41
Total	2,075	36.07	5.86	.34	41.44	6.65	.33	40.06	6.85	.35
				Fort Sill						
Half 1	1,094	35.46	5.76	.40	41.11	6.47	.26	39.45	6.47	.35
Half 2	1,110	35.57	5.89	.24	41.00	6.85	.28	39.58	6.80	.26
Total	2,204	35.51	5.82	.32	41.05	6.66	.27	39.52	6.64	.30

[a] Key score applied to Half 1 data.

[b] Key score applied to Half 2 data.

[c] Key score applied to total sample data.

DISCUSSION

There are several factors which should be mentioned before a discussion of the Phase II results is undertaken.

The most important of these is the fact that this research has been conducted with samples whose absolute base rate of success is approximately 85% (i.e., the percent of incoming enlistees who remain in the Army for at least 180 days). Given the expenditures associated with the 15% who are separated prior to that time, this base rate is too low and in need of improvement.

In research terms, this base rate of success also is unfavorable, but for different reasons. Simply stated, an 85% - 15% success-failure rate results in item and key validities which are computed on a criterion with relatively few cases in one of its two categories. The resulting correlations are therefore much more subject to sampling fluctuation than correlations computed on continuous data, or on data with a more favorable criterion category split, or in exceptionally large samples. Since the criterion split is fixed, the most reliable correlations reported here are those computed on the total sample, the largest sample available. For this reason, the correlations developed in the total sample are given primary emphasis in this discussion.

Related to the base rate issue, and also likely to have had some impact on the results observed, is the fact that the success rate for Phase II was significantly higher than that of Phase I (85.5% vs. 83.8%; $z=2.02$, $p<.05$). The cause of the higher Phase II rate is not determinable, but whatever the cause, the net effect was to enter a restriction of range factor into the validity results that likely attenuated the observed correlations. Since the cause is not determinable, it is not possible to correct for it (Thorndike, 1949).

EP-EEQ/EEQ-3A

In the interest of parsimony, no further reference will be made to the Stage 1 results. Since the Stage 2 results include data on the same subgroups and are essentially the same as those of Stage 1, only the Stage 2 results will be referred to in subsequent discussion.

A side-by-side summary of the Stage 2 and Stage 3 initial validities and cross-validities for the subgroups represented in Phase I and II is presented in Table 9. Initial validities for each group are in parentheses adjacent to the reported cross-validities.

Table 9

Stage 2 and 3 Initial Validities and Cross-Validities By Questionnaire[a]

Key	Total		Whites		Blacks	
Stage 2-Revised Phase I Keys						
EP-Enlistee Profile	.34	(.42)	.34	(.42)	.26	(.51)
EEO-Early Experience Questionnaire	.29	(.32)	.29	(.35)	.21	(.26)
EP+EEQ	.34	(.36)[b]	.34	(.36)	.25	(.46)
Stage 3-EEQ-3A Phase II Keys						
EEQ-3A (EP Items)	.38	(.37)	.37	(.37)	.40	(.32)
EEQ-3A (EEQ Items)	.29	(.32)	.33	(.33)	.20	(.35)
EEQ-3A (EP+EEQ)	.31[c]	(.38)	.31	(.37)	.38	(.31)

[a] Initial validities are contained within the parentheses immediately adjacent to the cross-validities.

[b] Estimated by a correlation of sums procedure to be .41.

[c] Estimated by a correlation of sums procedure to be .37.

Considering the keys separately, the Stage 3 EP key appears superior to the Stage 2 EP key. The Stage 3 key's validity improved on cross-validation for the total and black groups and stayed the same for whites. On the other hand, the Stage 2 EP key evidenced shrinkage on cross-validation in all comparable subgroups.

A comparison of the Stage 2 and Stage 3 EEQ key validities showed no improvement resulting from the rekeying. Both initial validities were of the same magnitude (r=.32), and both total sample cross-validities were of the same magnitude (r=.29). There were some fluctuations in comparable subgroup validities, with major deviations occurring in the subgroups most likely to be subject to sampling fluctuation (blacks and Fort Dix).

The combination of the keys yielded unexpected results in both stages. First, in Stage 2 the combination did not result in a validity based on the actual combination of the keys for the total sample. Only 1,137 Phase I enlistees had completed both questionnaires; thus, the validity for the keys combined is only an estimate of the initial validity of the combined keys. Considering the magnitude of the initial validities in Phase I and the results of the combination obtained in the Phase II sample where all enlistees had completed both sets of Phase I key items, the initial validity of the combination (r=.36) is probably an underestimate of the result that would have been obtained had all Phase I cases completed both Phase I questionnaires. To estimate the likely true validity, it was assumed that the validity observed for each key alone was the validity that would have been obtained had all enlistees completed both questionnaires and that the correlation of the keys (r=.72) based on 1,137 cases was the correlation that would have been obtained if all enlistees had completed both questionnaires. Then, by applying a "correlation of sums" procedure outlined by Guilford and Fruchter (1973), the correlation of the keys combined was computed. The correlation (r=.41) is consistent with the results observed for the keys combined in Phase II where all items were completed by all enlistees.

In Stage 3, the two keys combined yielded an initial validity slightly higher than either key taken singularly. However the cross-validity was lower than expected considering the cross-validity of the keys separately. This cross-validity was computed on the same reduced sample (N=1,137) previously discussed. Thus, making the same assumptions as before, an estimated cross-validity was computed by the correlation of sums procedure. The resulting cross-validity (r=.37) was consistent with the pattern observed in samples where all items were completed by all enlistees and thus is taken as the best estimate of the Phase II combined keys' cross-validity. A comparison of this cross-validity with the Phase I combined keys' cross-validity indicates the Phase II EEQ-3A key to be slightly superior.

EEQ-3B

A comparison of the EEQ-3B initial and cross-validities (Table 8) shows that both the Half 1 and Half 2 samples yielded comparable initial validities (r=.36), but unequal cross-validities (r=.30, .24 for the samples respectively). Thus, it appears that Half 1 has the most stable key. The total sample key generated a lower initial validity (r=.33). Due to the larger sample size and considering the data developed for the EEQ-3A keys, it is likely that the total sample validity is the best estimate of the true validity of the EEQ-3B items.

RECOMMENDATIONS

The results of the original research into the subject strongly suggested that it would be feasible to use autobiographical questionnaire data to assist in identifying potential enlistees with a high probability of early failure to adapt to Army life. The results of the current research strongly confirm that suggestion.

As a consequence of both studies, a pool of 55 out of the EEQ-3A's 61 items have been validated and cross-validated on samples of enlistees entering the Army at three Reception Stations: Forts Dix, Jackson, and Sill. Another pool of 32 out of the EEQ-3B's 51 items have been shown to be valid in the Phase II total sample of enlistees who entered the Army at Fort Dix and Jackson. Twenty-four of these were valid in both halves of the Phase II sample. In summary, a sufficient number of items with sufficient supporting validity data now exists to warrant an operational Armed Forces Entrance and Examining Station (AFEES) trial of autobiographical data use. The actual trial should be preceded by several steps, including the following.

1. The feasibility of developing alternate questionnaire forms should be explored. The development process should utilize the EEQ-3A and EEQ-3B Phase II total sample keys and rely on an item validity ordered listing of the items in these keys. Particular attention should be given to the validity of these items in the non-High School diploma, non-GED subgroup, which suffers a higher attrition than any other enlistee population. If such alternative forms are found to

be feasible, it is expected that each form will include (a) a common core of the most valid items (b) a second body of items allocated into the forms on the basis of their validity and content coverage, and (c) a third group of items found to be marginally valid, but worthy of future research.

2. The potential effect of various scoring systems should be pre-determined to the fullest extent possible. Criterion distributions by score level and subgroup should be generated and reviewed for each scoring key considered. Again, particular attention should be paid to the non-High School diploma, non-GED subgroup.

In addition to an operational trial, it is recommended that consideration also be given to the potential use of the item pool in predicting longer-term Army attrition. It is known, for example, that while 3,660 of the Phase II enlistees completed their first 180 days of service, a sizable number from among that group will be separated before completing their enlistment term because of one failure to adapt reason or another. Since questionnaire data already are available on these enlistees, determinations of the data's usefulness in predicting attrition over longer time spans is a relatively simple task.

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Experimental autobiographical questionnaires, including items validated in previous research and new items suggested by that research, were administered to samples of incoming Army enlistees at Forts Dix and Sill. Data on 180-day attrition were collected. Questionnaire results were item analyzed using attrition criterion, and cross-validities were computed for all items. Results substantially confirmed the earlier research outcomes and indicated that autobiographical information could assist in identifying enlistees most likely to experience early attrition.

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